

**IN THE CLAIMS:**

1       1. (ORIGINAL) A file server system for a computer having a processor, a memory cou-  
2       pled to the processor, and a system bus to which the processor and memory are coupled,  
3       the computer being configured to implement a file system, the file server system compris-  
4       ing:

5                 (A)      a storage operating system adapted to be executed by the processor;  
6                 (B)      a removable nonvolatile memory device coupled to the system bus, the  
7       removable nonvolatile memory device containing diagnostics code for the system; and  
8                 (C)      a set of boot instructions resident in the filer server system including in-  
9       structions for executing a normal boot routine upon a power-on of the system, and includ-  
10      ing instructions enabling the processor to identify the removable nonvolatile memory de-  
11      vice and to load the diagnostics code into the memory in response to a command to exe-  
12      cute a diagnostics boot routine instead of the normal boot routine.

1       2. (ORIGINAL) The system as defined in claim 1 wherein the removable nonvolatile  
2       memory device is a compact flash, the compact flash being divided into a plurality of par-  
3       titions with the diagnostics code residing in at least one of the partitions.

1       3. (ORIGINAL) The system as defined in claim 2 wherein one of the partitions of the  
2       compact flash is designated as a maintenance log into which test results and data are  
3       stored.

1       4. (ORIGINAL) The system as defined in claim 2 further comprising:

2             (A)    a input/output device coupled to the system bus, and which input/output  
3    device is identifiable by the processor; and

4             (B)    a second bus coupled between the input/output device and the compact  
5    flash in such a manner that when the processor identifies the input/output device, the  
6    compact flash is, in turn, initialized and the diagnostics code is executed upon a com-  
7    mand to run a diagnostics boot routine.

1       5. (ORIGINAL) The system of claim 1 further comprising:

2             (A)    a storage adapter coupled to the system bus; and  
3    at least one storage disk coupled to the storage adapter and containing files served by the  
4    operating system.

1       6. (CURRENTLY AMENDED) A file server system for a computer having a proces-  
2    sor, a memory coupled to the processor, and a system bus to which the processor and  
3    memory are coupled, the computer being configured to implement a file system, the file  
4    server system comprising:

5             (A)    a storage operating system adapted to be executed by the processor;

6             (B)    a removable nonvolatile memory device coupled to the system bus, the  
7    removable nonvolatile memory device containing diagnostics code for the system;

8           (C)    a set of boot instructions resident in the filer server system including in-  
9         structions for executing a normal boot routine upon a power-on of the system, and includ-  
10      ing instructions enabling the processor to identify the removable nonvolatile memory de-  
11      vice and to load the diagnostics code into the memory in response to a command to exe-  
12      cute a diagnostics boot routine instead of the normal boot routine;  
13           (D)    a storage adapter coupled to the system bus;  
14           (E)    at least one storage disk coupled to the storage adapter and containing files  
15      served by the operating system; and  
16           (E\_F)   a plurality of storage disks coupled to the storage adapter and data on the  
17      disks being stored in a write anywhere file layout system.

1       7. (ORIGINAL) The system as defined in claim 1 further comprising a motherboard  
2      upon which the processor, the memory and the set of boot instructions reside.

1       8. (ORIGINAL) The system as defined in claim 7 wherein the removable nonvolatile  
2      memory device containing the diagnostics code is resident external to the motherboard,  
3      and the diagnostics code on the removable nonvolatile memory device is adapted to be  
4      upgraded or amended free of taking the system out of service.

1       9. (PREVIOUSLY PRESENTED) The system as defined in claim 1 wherein said diag-  
2      nostic code includes code relating to the diagnostics of hardware devices including the

3 processor, the memory, the buses, the adapters, the disks, a compact flash and interfaces  
4 thereof.

1 10. (ORIGINAL) The system as defined in claim 1 wherein said boot instructions reside  
2 in firmware.

1 11. (ORIGINAL) A method of performing diagnostics in a filer server system, the filer  
2 server system having a processor, a memory coupled to the processor and having memory  
3 locations addressable by the processor, a storage operating system adapted to be executed  
4 by the processor, system firmware containing instructions for power-on self tests, a set of  
5 boot instructions including instructions for executing a normal boot routine upon a  
6 power-on of the system after the power-on self test is completed, the method comprising  
7 the steps of:

8 (A) providing a removable nonvolatile memory device interfaced with the moth-  
9 erboard, the removable nonvolatile memory device being identifiable to the processor;

10 (B) dividing the removable nonvolatile memory device into separate memory par-  
11 titions;

12 (C) storing a set of diagnostics instructions, being a diagnostics code, in one of the  
13 partitions of the removable nonvolatile memory device; and

14 (D) programming the system firmware to recognize a user implemented command  
15 for a diagnostics boot such that in response to the diagnostics boot command, the firm-

16 ware loads the diagnostics code residing in the removable nonvolatile memory device  
17 into the memory to execute a diagnostic boot routine instead of a normal boot routine.

1 12. (ORIGINAL) The method as defined in claim 11 including the further step of  
2 (E) maintaining, in a separate partition of the removable nonvolatile memory  
3 device, a maintenance log into which diagnostic test results data and data about the stor-  
4 age system are stored.

1 13. (ORIGINAL) The method as defined in claim 11 including the further step of:  
2 selecting as the removable nonvolatile memory device, a compact flash.

1 14. (ORIGINAL) The method as defined in claims 11 including the further step of:  
2 selecting as the removable nonvolatile memory device a personal computer (PC)  
3 card.

1 15. (ORIGINAL) The method as defined in claim 11 including the further step of:  
2 upgrading the diagnostics code without taking the file server out of service.

1 16. (ORIGINAL) A storage system for a computer configured to implement a file sys-  
2 tem, the storage system having a processor, a memory coupled to the processor and hav-  
3 ing memory locations addressable by the processor, a system bus to which the memory  
4 and the processor are coupled, an operating system adapted to be executed by the proces-

5        sor, system firmware containing instructions for power-on self tests and a set of instruc-  
6        tions for executing a normal boot routine upon a power-on of the system after a power-on  
7        self test is completed, the storage system comprising:

- 8                (A)        means for storing a set of diagnostics instructions comprising diagnostics  
9        code, in a removable nonvolatile memory device coupled to the system bus, the remov-  
10      able nonvolatile memory device being identifiable to the system; and  
11                (B)        means for executing the diagnostics code in response to a diagnostics boot  
12      command received by system firmware.

1        17. (ORIGINAL) The storage system of claim 16 further comprising:

2                means for coupling the removable nonvolatile memory device to the processor in  
3        such a manner that the diagnostics code may be upgraded without taking the storage sys-  
4        tem out of normal service.

1        18. (ORIGINAL) The storage system of claim 17, further comprising:

2                means for upgrading the diagnostics code by interfacing with the storage system  
3        through an associated input/output interface.

1        19. (ORIGINAL) computer-readable medium operating on a computer in a network that  
2        includes one or more storage systems sharing volumes, the computer-readable medium  
3        including program instructions for performing the steps of:

- 4                (A)        initiating a power-on self test when the computer is powered-on;

5           (B) identifying devices present in the computer;  
6           (C) in response to a successful power-on self test, commencing a normal boot  
7 routine;  
8           (D) recognizing a command for a diagnostics boot;  
9           (E) in response to the diagnostics boot command, probing devices to locate a  
10 removable nonvolatile memory device containing diagnostic boot instructions; and  
11           (F) interrupting the normal boot routine and executing the diagnostics code for  
12 a diagnostics boot for the computer.

1       20. (ORIGINAL) The computer readable medium as defined in claim 19 including the  
2 further instruction to identify a compact flash as the removable nonvolatile memory de-  
3 vice in which diagnostics code for the computer is stored.

1       21. (ORIGINAL) The computer readable medium as defined in claim 20 including fur-  
2 ther instructions to save diagnostics test results and other data in a predetermined address  
3 location in the compact flash associated with the computer.

1       22. (ORIGINAL) The computer readable medium as defined in claim 21 wherein the  
2 diagnostics boot command is initiated by a human maintenance operator.

1    23. (ORIGINAL) The computer readable medium as defined in claim 21 wherein the  
2    diagnostics boot command is initiated as an instruction in the computer readable medium  
3    upon the occurrence of a predetermined event.

1    24. (ORIGINAL) A diagnostic system for use with a storage system comprising:  
2                a removable nonvolatile memory device interconnected with the storage system,  
3    wherein the removable nonvolatile memory device containing boot diagnostic code that  
4    is loadable into the storage system as an alternative to a normal boot routine.

1    25. (ORIGINAL) The diagnostic system of claim 24, wherein the removable nonvolatile  
2    memory device further comprises a plurality of partitions.

1    26. (ORIGINAL) The diagnostics system of claim 25, wherein the boot diagnostic code  
2    is contained within a first partition of the plurality of partitions.

1    27. (ORIGINAL) The diagnostic system of claim 26, wherein the removable nonvolatile  
2    memory device further comprises a second partition, the second partition storing a diag-  
3    nistic log.

1    28. (ORIGINAL) The diagnostic system of claim 24, wherein the removable nonvolatile  
2    memory device is a PC card.

1    29. (ORIGINAL) The diagnostic system of claim 24, wherein the removable nonvolatile  
2    memory device is a compact flash.

1    30. (ORIGINAL) The diagnostic system of claim 24, wherein the storage system further  
2    comprises a firmware boot routine, the firmware boot routine having a process for select-  
3    ing between execution of either a normal boot routing or a diagnostic boot routine.

1    31. (ORIGINAL) A file server system for a computer having a processor, a memory  
2    coupled to the processor, and a system bus to which the processor and memory are cou-  
3    pled, the computer being configured to implement a file system, the file server system  
4    comprising:

- 5                 (A)    a storage operating system adapted to be executed by the processor;
- 6                 (B)    a removable nonvolatile memory device coupled to the system bus, the  
7    removable nonvolatile memory device containing diagnostics code for the system, the  
8    removable nonvolatile memory device also divided into a plurality of partitions with the  
9    diagnostics code residing in at least one of the partitions; and
- 10                (C)    a set of boot instructions resident in the filer server system including in-  
11    structions for executing a normal boot routine upon a power-on of the system, and includ-  
12    ing instructions enabling the processor to identify the removable nonvolatile memory de-  
13    vice and to load the diagnostics code into the memory in response to a command to exe-  
14    cute a diagnostics boot routine instead of the normal boot routine.

- 1    32. (ORIGINAL) The system of claim 29 wherein one of the partitions is designated as a
- 2       maintenance log into which test results and data are stored.
  
- 1    33. (ORIGINAL) The system of claim 29 further comprising:
- 2           a separate storage medium, the separate storage medium storing a boot routine.
  
- 1    34. (PREVIOUSLY PRESENTED) The system of claim 33, wherein the separate stor-
- 2       age medium is a partition on the removable nonvolatile memory device.